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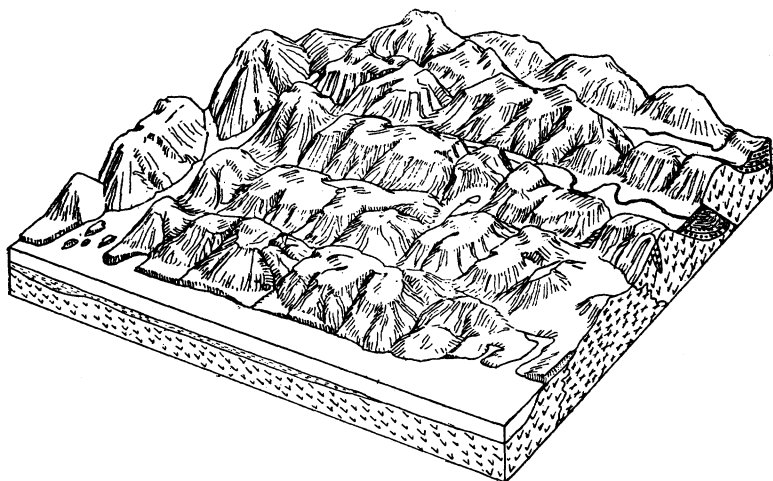
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NOTES ON THE DESCRIPTION OF LAND FORMS.—IX.

Intelligible Physiographic Presentation.

SOUTHERN VANCOUVER ISLAND. By Charles H. Clapp. *Memoir 13*, Dept. of Mines, Geol. Survey Branch, Ottawa, 1912.

It is natural that much material for the physiographic basis of geography should be found in geological reports; but it is seldom that material of this kind is presented with so much regard for geographical needs as in the case in Clapp's report on Southern Vancouver Island. After a bibliography and summary of general geology, there follows an account of the topography, first general (pp. 16-19), then local (pp. 19-22). This opens with refreshing directness by immediately stating the chief features of the district:—"Vancouver island is a mountain range, characterized by both flat-topped and ridge-like summits, and is the result of the mature dissection of an uplifted, subdued surface formed during a Tertiary erosion cycle acting on a heterogeneous group of deformed rocks." A little further on we read: "The Tertiary erosion surface . . . had reached be-



fore uplift a stage varying from late maturity to old age. It was peneplained in the southern part, where a few rounded, monadnock-like hills remained a few hundred feet above the general level. In the central region larger and higher monadnocks and small ranges of mountains—divide residuals—survived, which apparently had elevations of from 1,000 to 3,000 feet above the general Tertiary erosion level, and which are now from 5,000 to 7,000 feet above sea-level, a few peaks being even higher . . . The uplifted Tertiary erosion surface was maturely dissected during a pre-Glacial cycle by transverse rivers with large subsequent tributaries . . . During the Glacial period the island was apparently smothered by a thick ice-cap . . . Valley heads in the higher mountains were excavated by local glaciers, and the mountains now have characteristic serrated summits. Valley glaciers occupied and scoured out the larger

valleys, converting many of the westward flowing valleys into fiords, and deepening many of the interior valleys into large lake basins." A significant feature of this description is, that if an uplift is mentioned, the thing uplifted is first described, and then the changes following uplift are added; when glacial action is introduced, the surface which the glaciers found is explained, and then the changes which they produced in the pre-existing surface are added. Hence the reader can follow the writer, step by step; all the more easily with the aid of good plates and a rough block diagram (looking northward), here reproduced. Even a historian might with little difficulty extract from this report all the material he would need for the scenery of any human drama there enacted.

Complicated Physiographic Presentation.

SOUTHERN NIGERIA: Some considerations of its structure, people and natural history. By A. E. Kitson. *Geographical Journal*, XLI, 1913, 16-34.

The physiographic paragraphs of this paper open most encouragingly, but close disappointingly. Three divisions are briefly described: a coastal lagoon and delta belt, 3 to 60 miles wide, raised slightly above sea level; an intermediate belt, 50 to 100 miles wide, rising steadily northward to an altitude of about 650 feet, and consisting of various stratified deposits (their attitude is not mentioned); and several separate uplands, composed chiefly of crystalline rocks, and consisting partly of a northward-rising plain, with isolated hills or groups of hills rising out of the plain to heights of over 800 feet, and partly of a more dissected area. Then comes a page on geology, ending with an interesting but irrelevant paragraph about the varied animal life seen on a canoe trip in the coastal belt. Next follow four pages on "geographical history," again ending with an excellent but irrelevant paragraph, this time on a march along a narrow path through a dense forest. "Geographical history" here means the changes caused by deposition, deformation and denudation, and might well be called geology, except that its object is, more manifestly than is usually the case in geological chapters, the evolution of the present surface form; but just in so far as the origin of existing form is the object of these pages, they are unsatisfactory, because their contents continually distract the reader's attention from present features and leave him lost in a maze of past changes.

The beginning is easy:—During the Cretaceous period, a great basin, bounded by crystalline masses on the west and east, was occupied by a sea that extended northward. Then elevation took place and the basin became an estuary, a shallow lake and possibly a low-lying land. After this comes a succession of elevations and river-wrought changes, described in relation to utterly unknown local names—like Owai Ifunkpa and Udi-Orukuram—and the reader is left hopelessly and hopeless behind. He may, to be sure, try to follow the writer's intention by searching out the place names on the accompanying map; but as the part of the map under consideration has at least 400 names upon it, the search will be a difficult one. I venture to say that no reader, not even the most studious and patient, unless he has already travelled in Nigeria, will make out the writer's meaning in the two pages that end:— "Thus the lower Niger appears to have been formed" (p. 22). The author has evidently made abundant and careful observations, and has given much serious thought to his problems; but in the end this presentation of his physiographic results is impossible to follow. In view of the publication of his article in a geographical and not a geological

journal, existing surface forms are not given sufficient emphasis as compared to past changes. A diagram, indicating the essential physiographic features, with a few local names as guides, would have been a vast help to the reader in understanding the writer, and would not have cost nearly as much labor as a day's march. Many marches were made, but not a single diagram is offered. The reader is not sufficiently considered in this part of the essay.

A German Morphological Study.

MORPHOLOGIE DES MOSELGEBIETES ZWISCHEN TRIER UND ALF. By Bruno Dietrich. *Verh. Naturhist. Vereins der preuss. Rheinlande und Westfalens*, lxvii, 1910, 83-181.

This essay may be taken as typical of many modern German morphological studies, in that it is thorough and elaborate, but at the same time not presented in form for easiest apprehension by the inquiring reader. It opens with an empirical description of surface forms, then gives an account of geological structure; and only after some twenty pages takes up an explanatory description of the district. Thus on the first page one reads:—"The Eifel and Hunsrück [the western half of the Schiefergebirge of the Middle Rhine] exhibit a broad highland 'Hochfläche' of about 500 meters altitude, from which rise isolated ridges with southwest-northeast trend, which reach altitudes of 700 meters" (p. 84). But not until sixteen pages later is the reader given the elementary explanation that the Hochfläche is "ein typisches Rumpfgebirge, eine Peneplain" (p. 100), and not until ten pages later still are the surmounting ridges explicitly explained as "Härtlinge" or monadnocks (p. 110). The intermediate pages include descriptions of geological formations in greater detail than is needed for the understanding of their influence on surface form; while the introductory account of streams and valleys is purely empirical with an over-burden of local names, which might have been better left to graphic presentation on a map. The following is a sample: "The Prüm rises on the southwest slope of the Steinberg near Ormont in the Schneifel at an altitude of 635 meters. Its direction is in general southwesterly or southeasterly. In its lower course it receives two branches, namely, from the right, the Enz near Holsthum, and from the left, the Nims below Irrel" (p. 88). Not until ten pages after the six pages devoted to these dry details is mention made of the regional uplift which caused the incision of the valleys in the "Hochfläche."

It is difficult to understand why this order of statement is so often adopted by German geographers. Many of their essays are difficult reading, because the heavy, old-fashioned cart of empirical statement is placed before the more lively and energetic horse-sense of explanatory statement. The authors of the essays seem to belong to the modern explanatory school, as one may infer by the care that they take to learn the origin of the forms that they discuss; and yet they treat the forms at first empirically, as if an empirical statement could be better understood than an explanatory one; or as if anything so deep as an explanatory statement should not be reached until after the reader had waded through an empirical introduction. Furthermore, while these authors seem to be by intention students of land forms, if one may trust the titles of their essays in which "Morphologie" often enters, many of them stop short of morphology and get no further than the preliminary step of morphogeny. They do not use the origin of the forms as a means of describing them; they fail to reach the goal of mor-

phological products, as if lost in the complications of morphogenetic processes. Moreover it is too often true of these German essays that their value is obscured by an over-abundance of irrelevant erudition and an over-elaboration of trite discussion, as well as by an excessive use of unimportant local names, a lack of page- and paragraph-headings, and a scarcity of diagrams. There is of course not the least objection to morphogenetic studies, as such; they are, as above intimated, the necessary preparation for morphological descriptions; but it is regrettable to see so many essays in which an evident morphological intention has miscarried; in which a student of geography has been lost in the complications of geology. All such complications may deserve a young geographer's study as preparation for his further work; and the young German geographer never shrinks nowadays from the large labor of acquiring a knowledge of them; but when he prints the complications of the past in his essay, he is going far out of his geographical way.

The reason for giving up the older-fashioned empirical method of describing land forms and adopting the newer-fashioned explanatory method is that the newer method gives better results than the older one; it enables the reader to conceive more easily and correctly the things observed by the writer, because it provides so many well defined ideal types in terms of which the writer may describe the forms he has seen to the reader. If this were not the case, there would be no object in changing from the older to the newer method. And yet it often happens, as in the example here cited, that an author who seems to be of the explanatory school, if one may judge by the number of explanatory terms that he uses on his later pages, nevertheless opens his description with an old-fashioned empirical statement, and only many pages later presents the simple, concise, explanatory statement that might well, if the convenience and edification of the reader were given more consideration, come at the beginning.

To be sure, if an essay is prepared for uninformed readers, an empirical, inductive presentation of the land forms may be advisable; but in that case the manner of describing the geological formations ought also to be reduced to elementary form; but this is by no means the case in modern German geographical essays. The geology is maturely scientific; it is only the land forms that are treated empirically. Both subjects ought to be treated in a mature manner, if published in scientific journals. It is a serious mistake in these modern days for a well-trained student of morphology to embarrass himself and his readers by making a ten-page mystery of a peneplain, and a twenty page mystery of some monadnocks that rise above it. He may perhaps be led into this mistake by seeking to give an appearance of safety to his explanatory results, and therefore blanketing them in many wrappings of empirical descriptions; but this is a delusion. Safety of results is not determined by style or order of presentation, but by care in investigation; and that an investigation has been careful should become evident enough in the course of a fifty- or hundred-page essay, whether it opens empirically or not. The correspondingly valuable quality of presentation is intelligibility, and this quality is by no means secured through long empirical introductions.

Any reader who can understand the geological pages in Dietrich's essay ought to have no trouble in understanding at the outset such an explanatory statement as the following: "The Eifel and Hunsrück are two parts of an extensive uplifted peneplain, about 500 meters in altitude, eroded on a body of deformed and generally resistant rocks, interrupted by several linear quartzite monadnocks,

and dissected by many valleys, of which the chief, that of the Mosel, exhibits an exceptionally well developed meandering course." After reading such an introduction, details met on later pages easily take their proper relation to larger features.

On the later pages of the same essay, one finds, not exactly a mountain made out of a mole hill, but a profound problem made out of an open depression (the so-called Wittlicher Senke) that has evidently been rapidly and widely excavated along a south-northeast belt of weak strata while only narrow valleys were eroded in the harder rocks: the depression is already "old," while the valleys are only "submature or mature." The Mosel enters the southwestern end of the depression, follows its open floor for some kilometers, then shifts into the harder rocks on the southeast, where its admirable meanders are deeply incised; but the depression continues northeastward as far as the weak rocks that determine it, although in that part of its extent it is drained only by small streams. It is not worth while making an elaborate problem out of a feature that is so easily accounted for and so readily described as is this one.

Fault block Plateaus.

NOTES ON THE PHYSIOGRAPHY OF THE SOUTHERN TABLELAND OF NEW SOUTH WALES. By C. A. Süßmilch. *Journ. and Proc. Royal Soc. N. S. W.*, xliii, 1909-10, 331-354.

One seldom has the good fortune of coming upon a more clearly presented statement of a rare problem than is here offered. It is illustrated by good photographs, and by three profiles, but it is unsatisfactory in lacking an outline map, and in locating too many physical features in terms of local names not easily found on maps of Australia; nevertheless the text is exceptionally clear. The region described lies in the southernmost part of New South Wales; it consists of highly inclined strata intruded by granites and porphyries, which have been reduced over large areas to small relief, constituting the so-called Monaro peneplain. The peneplain might sometimes be called a plain; but it is by no means continuous; it is interrupted by various hills and highlands, some of which give evidence of earlier peneplanation; it is dissected by broad shallow late-mature valleys; and it is more deeply incised by valleys of later origin which are already mature in the weaker rocks but still young in the harder rocks. It was in association with the uplift by which the deeper dissection of the peneplain was prompted that it was broken into blocks by numerous faults, mostly of meridional trend, and uplifted with diverse displacements. The Kosciusko block is the highest, with a general altitude of 6,000 feet; Mt. Kosciusko, the loftiest summit in Australia, is a monadnock which rises about 1300 feet above its peneplain. Two narrow blocks, less uplifted than their neighbors, are described as "Senkungsfelder." The stronger fault scarps rise 1,000 or 1,500 feet; they are now more or less dissected, but are still striking features of the region; from a distance "they look like mountain ranges."

A similar topic is briefly treated by Griffith Taylor in a report on "The Physiography of the Proposed Federal Territory at Canberra" (Commonwealth Bureau of Meteorology, Melbourne, 1910). Fuller details regarding all these fault scarps will be looked for with interest.

W. M. DAVIS.